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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: 002187 USA/MC03/PDC/WF/OR

David ALUMOT, et al.

Appln. No.: 09/765,995

Group Art Unit: 2623

Confirmation No.: 1810

Examiner: Martin MILLER

Filed: January 19, 2001

For: OPTICAL INSPECTION APPARATUS FOR
SUBSTRATE DEFECT DETECTION

RESPONSE UNDER 37 C.F.R. § 1.116

MAIL STOP AF

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated December 22, 2003, for which the Examiner set a three-month period for response, Applicants submit the following remarks.

Claims 96-105 are all the claims pending in the application.

Claims 96, 97, 100, 101, 104, and 105 stand rejected under 35 U.S.C. §103(a) as being unpatentable over USP 4,764,969 to Ohtombe et al. in view of USP 5,185,812 to Yamashita et al. Claim 98 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ohtombe and Yamashita, further in view of USP 4,791,586 to Maeda et al. Claims 99 and 102 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ohtombe, Yamashita, and Maeda, further in view of USP 4,618,938 to Sandland et al. Claim 103 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ohtombe and Yamashita, further in view of Sandland. Applicants respectfully

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traverse these rejections, and request reconsideration and allowance of the claims in view of the following arguments.

Independent claim 96 and its dependent claims recite an apparatus for inspection of a substrate comprising a comparator, which calculates a difference between inspection signals and a reference signal to identify locations on a substrate suspected of having defects thereupon based on a threshold.

In the final Office Action, the Examiner has asserted that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. However, that is not what Applicants argued in their last response.

Applicants' position is that the necessary modifications to Ohtombe are not suggested by Yamashita, and vice versa. Clearly, some modification of either reference in view of the other is necessary in order to achieve the invention of claim 96 and its dependencies. Otherwise the Examiner is merely picking and choosing features from different prior art references. In the absence of a suggestion to make such a selection, and then to combine the selected elements, such an approach is improper.

In the August 2003 Response, Applicants argued that the Examiner's combination of Ohtombe and Yamashita is improper. In support of their position, Applicants argued that Ohtombe and Yamashita use completely different solutions. The Examiner has not really addressed this point. Ohtombe does not need the reference signal or the comparator calculating a difference between inspection signals and the reference signal in Yamashita, and there is no suggestion or motivation to combine the two references.

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Applicants also argued that the operational principle of Ohtombe is different from that of Yamashita. Even if a skilled artisan were to combine the two references, he/she would not be able to incorporate the Yamashita comparator into the Ohtombe apparatus without substantially changing the principle of operation of the references and substantially redesigning the construction of the references. This is not a matter of bodily taking an element from one reference and putting it in another (even if it appears that is what the Examiner is doing), rather, this is a matter of addressing the lack of viability of the resulting combination.

The Examiner has stated that the reference signal recited in the claims of the present application is functionally equivalent to the threshold value stored in Ohtombe's memory section, referring to col. 3, lines 49-51, and col. 4, lines 5-10 and lines 49-57. Applicants note that the Examiner appears to have misunderstood Applicants' argument about the reference signal. In the August 2003 Response, Applicants argued that Ohtombe does not need the reference signal or the comparator calculating a difference between inspection signals and the reference signal in Yamashita.

As previously presented, Ohtombe locates defect positions on a wafer surface by comparing brightness differences between reflections from unusual and normal portions on the surface. Ohtombe's image processing section 5 processes and analyses images using a preset procedure with a difference of diffuse reflection and Miller surface reflection. If there is a scratch or a defect on the surface of a wafer 1, the scratch or the defect causes diffuse reflection. The remaining portions of the surface cause Miller surface reflection. As shown in Fig. 3 of Ohtombe, a comparison section 45 compares digital image data from an A/D conversion section 41 with a threshold value from a

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memory section 43. Information on the coordinate values corresponding to defective and potentially defective portion is then transmitted to main control section 6.

On the other hand, as shown in Fig. 1A of Yamashita, a design pattern data input section 10 holds reference pattern data representing a typical pattern of a circuit pattern on a magnetic disk. An arithmetic unit 17 subtracts the reference pattern data from multivalued image data, representing the distribution of density of a two-dimensional inspected pattern, to obtain the difference between the two pieces of input data. A data comparator 18 obtains the density difference between the inspected pattern and the reference pattern.

The Examiner has agreed that Ohtombe fails to disclose the recited comparator that calculates the difference between the inspection signals and a reference signal. However, the Examiner then asserted that Yamashita teaches such a comparator, and the Examiner combined the two references in this way to reject claims of the present application. However, the Examiner has failed to put forth a convincing line of reasoning to show why a skilled artisan would have added the comparator 18 of Yamashita, which obtains density difference of input signals, to the image processing section 5 of Ohtombe, which analyses brightness differences between reflections from unusual and normal portions on the surface. Accordingly, Applicants reassert that Ohtombe does not need the reference signal or the comparator calculating the difference between inspection signals and the reference signal in Yamashita. Applicants further reassert that there would have been no reason to combine these two references, even with the teachings of the present application.

The Examiner has stated that the test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art, citing *In re Keller*, 642 F.2d

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413, 208 USPQ 871 (CCPA 1981). However, as previously presented, it is well settled in the law that if the proposed modification or combination of the prior art would change the principle of operation of the prior art being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious, *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). See also *In re Gordon*, 733 F.2d 900, 221, USPQ 1125 (Fed. Cir. 1984). Noticeably, in §2145 of MPEP, the holding in *Ratti* is used as an exception to that in *Keller*.

Here, Ohtombe locates defect positions on a wafer surface by comparing brightness differences between reflections from unusual and normal portions on the surface, while the comparator 18 of Yamashita obtains density difference of input signals. Because the type of signal processed by the Ohtombe comparator 45 and the Yamashita comparator 18 are different, replacing the Ohtombe comparator 45 with the Yamashita comparator 18 not only changes the operation principle of the Ohtombe image processing section 5, but also will change the signal processing logic and operation principle of the Ohtombe main control section 6. These changes may also prevent the Ohtombe apparatus from achieving its goal. Thus, even assuming *arguendo* that a skilled artisan were to combine the two references, he/she would not be able to incorporate the Yamashita comparator into Ohtombe apparatus without substantially changing the principle of operation of the references and substantially redesigning the construction of the references. Accordingly, Applicants reassert that it is improper for the Examiner to combine Ohtombe and Yamashita and the cited references do not suggest the combination the Examiner has made.

The Examiner has further stated that Yamashita provides an example of analysis in accordance with the well-known techniques mentioned in Ohtombe for use with the Ohtombe

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apparatus, and thus concluding that there is teaching, suggestion or motivation to combine Ohtombe and Yamashita in these references. The Examiner refers to Ohtombe, col. 3, lines 48-52, and col. 4, lines 5-10 and lines 36-40, and Yamashita, Abstract and col. 6, lines 49-67. Applicants respectfully disagree.

Applicants' examination of the cited portion of the references did not reveal any such teaching, suggestion or motivation. The cited parts of Ohtombe discuss processing of brightness signal, using diffuse reflection and Miller surface reflection, while the cited parts of Yamashita are completely about processing of density signal. Nowhere does the portion of Yamashita that the Examiner cited discusses processing of brightness signal, diffuse reflection or Miller surface reflection. In the event that the Examiner continues to maintain there is such teaching, suggestion or motivation, Applicants respectfully request the Examiner to explain his reasoning. For now, Applicants reassert that there is not teaching or suggestion in the prior art to combine the cited references.

From the foregoing, Applicants respectfully resubmit that Ohtombe fails to teach the comparator cited in claims of the present invention, and the Examiner's combination of Ohtombe and Yamashita is improper. None of other cited references remedies the deficiencies of Ohtombe and Yamashita. Therefore, Applicants respectfully resubmit that independent claim 96 and its dependent claims 97-105 are patentable.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner